

PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Applicants: Jayapalan et al. Examiner: na
Serial No. na Art Group: na
Filing Date: February 15, 2002 Docket No. CE08888R

**Title: ESTABLISHMENT OF COMMUNICATIONS USING POINT TO POINT
PROTOCOLS SUCH THAT DUPLICATE NEGOTIATIONS ARE AVOIDED**

Assistant Commissioner for Patents
U.S. Patent and Trademark Office
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

Applicant respectfully submits the following Preliminary Amendment to be entered with the attached new U.S. patent application.

IN THE SPECIFICATION:

Please replace paragraphs [0017], [0022], [0024] and [0028] with the following replacement paragraphs:

[0017] As shown, the base station controller 324 is coupled to a packet network 310 comprising an IWU 308. Likewise, the mobile switching center 326 is coupled to a circuit switch network 314 also comprising an IWU 312. As known in the art, an IWU enables communications between the devices to which they are coupled (e.g., a base station controller or mobile switching center) and a network. In alternate embodiments, the IWUs 308, 312 may be embodied in devices such as a packet data serving node (PDSN) or an access gateway, which devices are well known to those having ordinary skill in the art. Note that the base station controller 324 or mobile switching center 326 are network elements capable of implementing the present invention. Finally, the IWUs 308, 312 residing in the packet and circuit switch networks may themselves be coupled to a public network 350 such as the Internet or World Wide Web.

[0022] Regardless, each peer, upon transmitting its corresponding configuration request 502, 504 also initiates a timeout timer by which it awaits response of a configuration acknowledgment. However, in this case, the duration of the first timeout timer 510 in the communication unit is shorter than the duration of the second timeout timer 512 in the IWU. This leads to the acknowledgment 506 transmitted by the communication unit being received by the IWU prior to expiration of the second timeout timer. As a result, the peer process within the IWU assumes that the initial link control phase of PPP has been successfully initialized, and begins the authorization phase by issuing an appropriate challenge 516. However, the shorter duration of the first timeout timer 510 results in the acknowledgment 508 sent by the IWU arriving at the communication unit only after the first timeout timer 510 has expired, as shown. In response, the communication unit attempts to begin negotiations anew and retransmits its configuration request 514. As a result, at least one additional negotiation loop will be incurred before the PPP has been established, thereby delaying call setup. Note that in both scenarios illustrated in FIGs. 4 and 5, the network element 204 merely sends the control messages (i.e., the configuration request and acknowledgments) through to the respective peers in a transparent fashion. That is, the network element 204 has no knowledge of the contents of the control messages. This is illustrated in FIG. 1 where the PPP messages exchanged by the terminating protocol layers in the peers (communication unit and IWU) pass through the network element unchanged.

[0024] Beginning at block 602, the network element monitors messages exchanged between peers to determine if a point to point protocol control message has been sent by a first peer, particularly control messages relating to the negotiation phase of a point to point protocol session by the first peer, e.g., configuration request. To this end, the network element, rather

than transparently passing point to point protocol messages through to their destinations, instead inspects any messages including data destined for the PPP layer in a peer. In particular, the network element starts monitoring after the physical links (i.e., between an MS and IWU and network element) have been established. Thereafter, the network element inspects every packet that passes through it looking for packets that contain a PPP header indicating status as a control message or a data message. If a control message from the first peer is not detected at block 602, meaning instead that a data message was sent, processing continues at block 604 where the network element waits a configurable predetermined period of time, typically on the order of hundreds of milliseconds. The particular duration selected is preferably selected based on optimization measurements made during system configuration and setup. Regardless, after waiting, the network element determines, at block 606, whether a control message has been received from the second peer. If not, again implying that a data message was sent by the second peer to the first peer, it is assumed that a point to point protocol session has already been established between the peers and the process is terminated. In the context of the present invention, this means that any stored parameters (described below) are discarded and monitoring for control messages ceases until a new call is started.

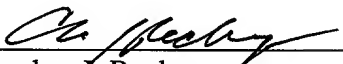
[0028] As schematically indicated by the circles in FIGs. 7 and 8, a network element in accordance with the present invention monitors PPP messages sent between peers. Thus, in both FIGs. 7 and 8, the network element 204 stores the parameters associated with the acknowledgment sent by the IWU 206 in response to the configuration request sent by the communication unit 202. Thereafter, it recognizes the retransmission 702 of the configuration request by the communication unit. In the scenario of FIG. 7, the non-preferred technique of simply discarding the retransmitted request 702 is illustrated. In this case, the IWU never

receives the retransmitted request 702 because the network element determines that it had previously been acknowledged by the IWU. As a result, the IWU retransmits its own configuration request 704, which retransmitted request is passed on to the communication unit because it was not previously acknowledged. Thereafter, the retransmitted request 704 from the IWU is acknowledged 706 by the communication unit. In contrast, FIG. 8 illustrates the preferred embodiment in which an acknowledgment 802 is transmitted by the network element back to the sender of the retransmitted request, i.e., the communication unit. Generally, it is preferred to acknowledge the retransmitted request in order to cleanly terminate the handshake protocol from the point of view of the peer that has retransmitted the configuration request.

REMARKS

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned: "Version With Markings To Show Changes Made".

Respectfully submitted,

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Date: February 15, 2002

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

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configuration request 514. As a result, at least one additional negotiation loop will be incurred before the PPP has been established, thereby delaying call setup. Note that in both scenarios illustrated in FIGs. 4 and 5, the network element 204 merely sends the control messages (i.e., the configuration request and acknowledgments) through to the respective peers in a transparent fashion. That is, the network element 204 has no knowledge of the contents of the control messages. This is illustrated in FIG. 1 where the PPP messages exchanged by the terminating protocol layers in the peers (communication unit and IWU) pass through the network element unchanged.

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